

Density monitoring procedure and apparatus for compact materials such as nuclear fuel pellets uses output signal from resonator

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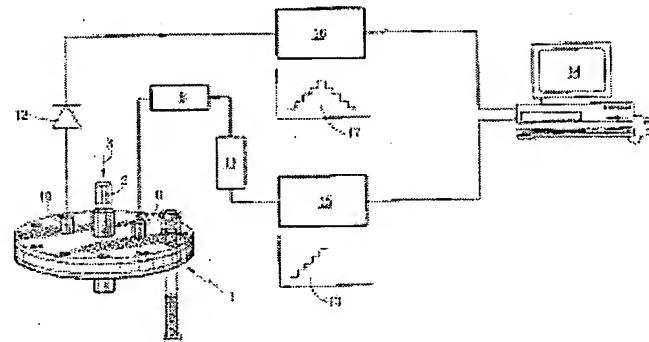
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Abstract of FR2798463

The procedure for monitoring the density of elements (2) of more or less constant shape and size and made from a compacted material, such as cylindrical nuclear fuel pellets, consists of introducing the elements continuously, one after another, into the cavity of a resonator (1) of appropriate dimensions. The resonator is subjected to a high-frequency signal which is varied over a predetermined period of time, an electrical output signal is detected, and the resonant frequencies in the presence of the element and without it are determined, and their values are used to calculate the density of the material. Where the pellets are of uranium oxide (UO₂) the signal frequency is varied in a range of 2 to 4 GHz, and the resonator is used to determine the following parameters: resonant frequency of resonator, quality factor in presence of element, relative dielectric constant of elements, dielectric losses and tangent of angle of losses, with the measured value compared with a predetermined value for the density limit for the elements. The monitoring apparatus includes an oscillator (11), capacitive antennae (8, 10), a detector (12) and computer (14).



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